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Perceptual Training in Sports Games – Evaluation of the Colour-Cue Method

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Abstract:**Introduction:**

Amongst others, research on perceptual-cognitive expertise in sports revealed that experts are better able to make predictive decisions in complex situations. Consequently, from a practitioner's perspective it would be highly relevant to know whether this advantage can be trained. A possible intervention is the so called colour-cue method that guides attention to information rich areas (e.g. Cañal-Bruland, 2009). However, findings are inconsistent and there is a recent need for research especially in regards to its operationalization (Abernethy, Schorer, Jackson, & Hagemann, 2012). Therefore, in the study at hand the effect of different colour cues on decision making and gaze behaviour was experimentally compared.

Methods:

In a mixed-factorial design, four groups with 10 students each viewed two times 12 scenes in which four players were displayed which passed a volleyball three times in sequence to one of two possible players. By use of a button response system (1000 Hz) participants had to decide as fast and accurate as possible which player would receive the ball and continue playing. For one of three decisions in each scene, at the moment of the pass the receiving player was marked with one of 2 times 2 possible colour cues (small vs. big, static vs. flickering). The gaze behaviour was captured with an integrated eye-tracking system (EyeSeeCam, 200Hz). For the comparison of marked vs. unmarked decisions as dependent variables the time and the correctness of the decision as well as fixations at the receiving player were calculated and statistically analysed with a 2 (mark) x 2 (size) x 2 (frequency) ANOVA with repeated measure on the first factor and planned t-tests.

Results:

A significant three-way interaction was found for decision time, $F(1, 36) = 6.60$, $p = .01$, $\eta_p^2 = .15$, with significantly earlier decisions for the colour cues small/flickering, big/static and big/flickering (all $ps < .02$) when comparing marked vs unmarked trials. Furthermore, significant main effects for decision correctness as well as fixation onset and fixation duration were revealed (all $ps < .01$) with beneficial effects for marked decisions. Finally, for marked decisions only, a significant between-subjects effect for size, appeared, $F(1, 36) = 8.93$, $p = .01$, $\eta_p^2 = .19$, with an earlier fixation onset for big compared to small colour cues.

Discussion:

The findings elucidate that the application of colour cues resulted not only in faster and more accurate decisions but also in a more optimal gaze behaviour characterised by earlier fixation onsets and longer fixation durations. However, the efficiency of this method clearly depends on its properties, so that the most functional colour cue should be evaluated in advance of implementing those cues in perceptual training. Currently, these findings are used to design a video-based perceptual training intervention for beach volleyball players.

References:

- Abernethy, B., Schorer, J., Jackson, R. C., & Hagemann, N. (2012). Perceptual training methods compared: The relative efficacy of different approaches to enhancing sport-specific anticipation. *Journal of Experimental Psychology: Applied*, 18, 143-153.
- Cañal-Bruland, R. (2009). Guiding visual attention in decision-making – verbal instructions versus flicker cueing. *Research Quarterly for Exercise and Sport*, 80, 369-374.